VOL. 13 OCTOBER, 1940 NO. 4

Journal

OF THE

Kansas Entomological Society

PUBLICATION COMMITTEE
PAUL B. LAWSON, Editor, Lawrence
R. H. BEAMER, Lawrence R. H. PAINTER, Manhattan
DWIGHT ISELY, Fayetteville, Ark.

WARREN KNAUS
1858-1937

Entered as second-class matter June 7, 1939 at the Post Office at Manhattan, Kansas, under the Act of August 24, 1912

Kansas Entomological Society

VOL. 13 OCTOBER, 1940 NO. 4

DORYLAIDAE NOTES AND DESCRIPTIONS (PIPUNCULIDAE-DIPTERA)

D. Elmo Hardy, Lawrence, Kansas*

The new species discussed in this paper have been encountered while making a comparative study of the male genitala throughout the family **Dorylaidae.** These structures have proved especially important in the taxonomy of the genus **Tömösváryella.** Most of the specimens included in this study were taken by the Snow Entomological Expedition, under the direction of Dr. R. H. Beamer, the summer of 1939 and unless otherwise specified the types are in the Snow Entomological Collection, University of Kansas.

A very recent development in the genus **Tömösváryella** has brought to light two of the new synonyms which are recorded here. The writer is greatly indebted to Dr. Marton Aczél of the Royal Hungarian Institute for Plant Protection for his energetic cooperation in studying the type of **coquilletti** and for presenting compared specimens of this species, as well as **sylvatica** (Meigen), for study. The writer had requested that the type of **coquilletti** (Kertesz) be examined in an attempt to place it properly, Dr. Aczél made careful drawings of the type of this species and of **sylvatica** (which Kertesz allied to **coquilletti**); study of the compared specimens proved the following synonomy without question.

Tömösváryella coquilletti (Kertesz)

Pipunculus coquilletti Kertesz, 1907, Annales Musei Nationalis Hungarici, v, 582-583.

Pipunculus proximus Cresson, 1911, Trans. Am. Ent. Soc. XXXVI, 318-319. New synonomy.

This is a very common and wide spread species in America and is also found in at least parts of Europe. Dr. Aczél discovered that specimens from Hungary, which he had considered as a new species, were the same as **coquilletti** and the compared Hungarian specimens presented were identical with homotypic specimens of **proximus.**

Tömösváryella sylvatica (Meigen)

Pipunculus sylvaticus Meigen, 1824, System. Beschr. der Bekannten Europ. Zweifl. Ins. IV, 20.

Pipunculus scoparius Cresson, 1911, Trans. Amer. Ent. Soc. XXXVI, 317. New synonomy. Specimens of **sylvatica** sent from Hungary by Dr. Aczél proved identical with homotpic specimens of **scoparius.**

*Contribution from Department of Entomology, University of Kansas.

Dorylas ater (Meigen)

Pipunculus ater Meigen, 1824, System. Beschr. der Bekannten Europ. Zweifl. Ins. IV, 23.

Pipunculus cingulatus Loew, 1865, Centuria VI. Berl. Ent. Zeit., IX, 176. New synonomy. Specimens of **ater** from Germany have been compared with the type male of **cingulatus**, no. 453, in the Cambridge Museum of Comparative Zoology and found to be conspecific with it.

Pipunculus fuscus Cresson (nec Loew), 1911, Trans. Amer. Ent. Soc. XXXVI, 301. New synonomy. The species described by Cresson as **fuscus** Loew was actually the species which Loew described as **cingulatus.**

Pipunculus horvathi Kertesz, 1907, Ann. Musei Nationalis Hungarici, V, 579-580. New synonomy. Association of the sexes has proved this to be the female of **ater** Meigen (**cingulatus** Loew), the two sexes are not dimorphic except that the female abdomen is more consistently shining on the dorsum. The sexes have long been considered two distinct species but all doubt of their association was removed when the writer took them in copulation.

Pipunculus townsendi Malloch, 1913, Proc. U. S. Nat. Mus, 43, 292, New synonomy. Homotypic specimens compared with Loew's type of **cingulatus** proved them to be conspecific.

Dorylas kansensis n. sp.
(Plate 1, Figs. 1a-1e)

This species is related to **affinis** (Cresson), and because of the structural (aside from genital) similarity the writer had considered it just a subspecies until the male genitalia were studied. These structures present ample evidence of its specific rank.

The species differs from **affinis** in being more melanistic; having the third antennal segment shorter, subacuminate below (fig. 1a); thorax and abdomen subshining, lightly dusted with gray, abdominal segments without distinct cinereous vittae, fifth segment scarcely longer than the fourth; third section of the costa is slightly shorter than the fourth and the ultimate section of fourth vein (M_{1+2}) strongly sinuate (fig. 1e.). The upper one-half of the front in the females is shining black and the ovipositor is slightly longer than in **affinis**, extending to the base of the third abdominal segment (fig. 1b).

The male genitalis of **affinis** and **kansensis** are nearly identical from dorsal view, being symmetrical without marked depression apically. The hypopygium is more nearly equal the length of the fifth abdominal tergum in **kansensis**, due to the shortness of that sclerite (fig. 1c). From a ventral view the genitalia is very distinctive, the ninth segment is about as wide as long with a deep U-shaped

cleft in middle on apical margin, the cleft extends about three-fourths the length of the segment on a median line, The harpagones are broad, bluntly pointed, strongly scleritized and dark in color; the inner clasper is the wider and very slightly longer than the outer (fig. 1d). The membranous portion is on the apex of the eighth on the right. The seventh sclerite is about the same width as the base of the inner clasper; the sixth segment is reduced to a narrow strip and curves under the claspers giving support to the wall of the genital chamber.

Length male: body 3.6-3.8 mm.; wings, 4-4.1 mm.

Length female: body, 3.5 mm.; wings, 4mm.

Holotype male: Douglas County, Aug. 27, 1939 (R. H. Beamer); allotype, female and twenty-six paratypes (thirteen males, thirteen females) same locality and collector, Aug. 23-27, 1939. Five paratype males, Tokio, North Dakato 7-28-1937 (C. L. Johnston); three males, four females, Tonganoxie, Kansas, May 6, 1939 (D. E. Hardy); one male, one female, Barberton, Ohio, 8-10-1936 (L. J. Lipovsky); three males, three females, Cherokee Co., Kansas 8-30-1939 (R. H. Beamer); two females, Garnett Co., Kansas, 8-29-1939 (R. H. Beamer) and one female, Logan Canyon, Utah, July 26, 1939, (W. P. Nye, G. S. Stains).

One paratype returned to Utah State Agricultural College.

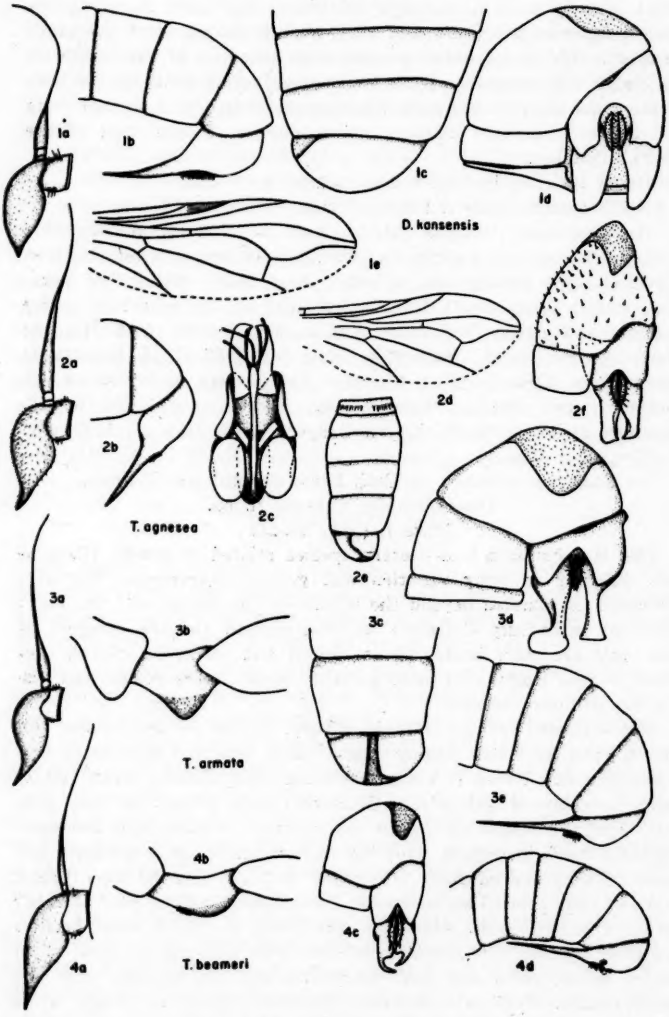
Tömösváryella agnesea n. sp.

Plate 1, (Figs. 2a-2f)

This is a common mid-western species related to **similis** (Hough) but differing in wing venation and genital characters. The r-m crossvein is situated beyond the middle of the discal cell; the ninth segment is broadly U-shaped on hind margin and the claspers of the male are more broad, square tipped and blunt, the eighth segment is also longer and more pointed; larger, more robust and distinctly pollinose species.

Male—Head: Frontal triangle silvery, darker in the middle, upper portion of front shining black; third antennal segment acuminate (fig 2a), brown to black in ground color, densely white pubescent; mouthparts yellowish. Compound eyes joined for less than one-third the length of the frontal triangle. **Thorax** and **abdomen:** Metallic black in ground color but rather densely gray pollinose and more thickly haired than in **similis.** Humeri and halteres bright yellow. Legs colored as in **similis,** front femora with a pair of flexor bristles near bases; mid-coxae with two to three long bristles at their apices; hind trochanters each with a clump of stout short hairs below, these are more numerous but not so long and thin as in **similis.** Femora moderately thickened, spines very weak; tibiae almost straight; hind tarsi flattened and dilated. **Wings:** very faintly iridescent, third section of costa about one-half the length of the

PLATE I


1a
1b
1c
1d
D. konsensis
1e
2a
2b
2c
T. agnesea
2d
2e
2f
3a
3b
T. armata
3c
3d
3e
4a
4b
T. beameri
4c
4d

fourth; fifth section almost twice as long as third and fourth combined. Crossvein r-m situated about half way between the ends of veins R_1 and R_{s+s} and beyond the middle of the discal cell; last section of fourth vein sinuate (fig. 2d). Sides of abdomen almost straight, widest at second and third segments; fifth segment but little longer than the fourth. **Hypopygium:** About three-fourth the length of the fifth segment, scarcely compressed to the right, with a large apical depressed area; the longitudinal groove lies slightly to the left due to the longer overfolding of the eighth segment on the right side (fig. 2e). From ventral view, in a relaxed condition, the hypopygium is usually quite acutely pointed due to the expansion of the membranous areas at the apex. The ninth sclerite is about as broad as long, with a broadly U-shaped concavity on the hind margin, cleft less than one-fourth its length. Harpagones broad and flat, rather square tipped and but slightly hollowed out on the inner margins below (fig. 2f). Aedeagus with two large basal supporting plates attached to ninth sclerite by apodemes (fig. 2c).

Length: body, 3 mm.; wings, 2.7 mm.

Female: The females are for the most part inseparable from **similis** unless accompanied by the males. The upper one-third of the front is shining black; the r-m crossvein is situated at or beyond the middle of the discal cell; the ultimate section of the fourth vein is slightly curved instead of straight, as in **similis** and the body is more pollinose. Posterior tarsi flattened and somewhat swollen, first tarsal subsegment almost equal to the remaining four. Base of ovipositor subglobose, shining black, piercer scarcely longer than base (fig. 2b) and extending just beyond apex of third segment.

Holotype male, Lawrence, Kansas, Aug. 22, 1939 (Agnes T. Hardy); allotype female same data. Paratypes: thirteen males, eleven females, same locality as holotype, Aug. 22-27, 1939 (R. H. Beamer, A. T. Hardy, D. E. Hardy, G. H. Vansell); six males, three females, Manhattan, Kansas, July 9-Nov. 6, 1934-1937, D. A. Wilbur); two

EXPLANATION OF PLATE 1

Fig. 1. Dorylas kansensis n. sp.
a. antenna; b. female abdomen, lateral view; c. male abdomen, dorsal view; d. male genitalia, ventral view; e. wing.

Fig. 2. Tömösváryella agnesea n. sp.
a. antenna; b. female ovipositor, lateral; c. male genitalia, dorsal view with eight segment removed; d. wing; e. male hypopygium, ventral view.

Fig. 3. Tömösváryella armata n. sp.
a. antenna; b. hind trochanter of male; c. male hypopygium, dorsal view; d. male hypopygium, ventral; e. female abdomen, lateral.

Fig. 4. Tömösváryella beameri n. sp.
a. antenna; b. hind trochanter of male; c. male hypopygium, ventral; d. female abdomen, lateral.

males, Cherokee County, Kansas, April 20, 1935, Aug. 30, 1939 (R. H. Beamer); one male, Garnett, Kansas, Aug. 29, 1939 (J. D. Beamer); one male, Coconino County, Arizona, Aug. 18, 1927 (R. H. Beamer); one male, Oak Creek Canyon, Arizona, 6000 ft., Aug. (F. H. Snow); one male, Eagle Pass, Texas, 1-29-33 and thirteen males, three females, Sioux City, Iowa, July 11-Aug. 24, 1931 (C. N. Ainslie).

Paratypes are being returned to Kansas State College; University of Minnesota and Texas A. and M. College.

Tömösváryella armata n. sp.

(Plate 1, Figs 3a-3e)

This species belongs to the **vagabunda** group by having the hind trochanters of the male armed with tubercles; the shape of these developments and the male genital characters will distinguish it from all other species.

Male: Rather sparcely haired species, dorsocentral hairs present and also scattered marginal hairs on mesonotum, scutellum and abdomen. **Head:** Face and frontal triangle silvery, the latter slightly darker; front shining black above junction of eyes; eyes joined for more than half the length of the frontal triangle. Antennae black, third segment acuminate (fig. 3a). **Thorax** and **abdomen** subshining black in ground color rather densely brownish pollinose; grayed on the margins, pleurae and metanotum. **Legs:** Femora moderately thickened, flexor spines weak; front femora with one or two rather weak flexor bristles near bases, middle coxae with three to four moderately strong black apical bristles. Hind trochanters comparatively short in length, each with a distinct obtuse carina or tubercle just beyond the middle below (fig. 3b); this tubercle is thickly covered with microscopic white pile. Hind tibiae slightly curved, tarsi flattened; basitarsi longer than the next three subsegments. **Wings:** Very lightly iridescent, third costal section about half the length of the fourth; fifth section about twice the length of third and fourth sections combined. Crossvein r-m situated much beyond the end of vein R_1 and at middle of discal cell; ultimate section of fourth vein about straight; last section of fifth shorter than posterior crossvein. Sides of abdomen somewhat rounding, fifth segment about one-third longer than fourth. **Hypopygium:** Rather symmetrical, broadly rounding, about three-fourths the length of the fifth segment, only slightly compressed to the right with a broad longitudinal groove medianly and a distinct apical depression (fig. 3c). Ninth segment about as broad as long, with a V-shaped cleft apically about three-fourths of its length on median line. Harpagones asymmetrical, inner clasper greatly enlarged at apex with a large rounding lobe on right side, from ventral view; outer clasper en-

larged at apex but not so developed (fig. 3d).

Length: body, 3 mm.; wings, 2.8 mm.

Females: The females associated here have the upper one-third of the front shining with a narrow black stripe extending down into the silvery area; the hind trochanters are unarmed except for a few pale hairs below; the tarsi are more flattened and dilated. The base of the ovipositor is globose, the piercer about twice its length and gradually tapering at base (fig. 3e); piercer extending to apex of second abdominal segment.

Holotype male, Griffin, Ga., Aug. 12, 1939 (J. D. Beamer); allotype female and one paratype female same data; one paratype male, Okefenokee Swamp, Ga., July 27, 1939 (A. T. Hardy) and three paratypes, one male, two females, Billy's Island, Okefenokee Swamp, Ga., July 1912 (Cornell University Expedition).

Two paratypes being returned to Cornell University.

Tömösváryella beameri n. sp.

(Plate 1 figs. 4a-4d)

This species is related to **similis** (Hough) but the male genitalia is very distinctive. The specimens are also smaller in size.

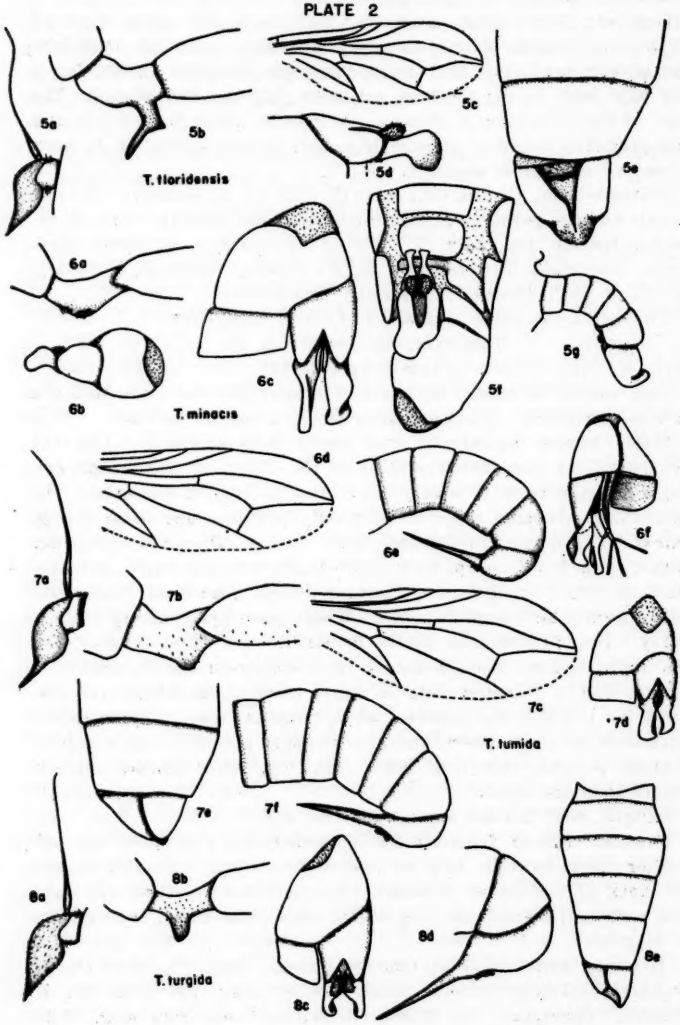
Male: Fitting the description of **similis** in most details. The eyes are joined for less than one-third of the length of the frontal triangle and the front is silvery above the junction of the eyes. The thorax and abdomen are more distinctly pollinose and more thickly haired. The dorsocentral hairs rather strong. Posterior trochanter with just a few inconspicuous short hairs, and distinctly carinated beneath (fig. 4b). Posterior basitarsi longer than next four tarsal subsegments; hind tarsi flattened. Wings more hyaline, very slightly milky. Hypopygium like **similis** in dorsal view, from ventral view the ninth segment is much longer than wide, equaling the eighth in length, with a V-shaped cleft on apical margin, extending over one-third its length. Harpagones very irregular, almost symmetrical, with their posterior lateral margins strongly produced into a pair of sharply pointed, incurving lobes (fig. 4c); inner clasper slightly longer than the outer.

Length: body 2 1-2-3 mm.; wings, 2.2 mm.

Female: Differs from **similis** in having the piercer of the ovipositor about twice as long as base (fig. 4d) and extending beyond the apex of the second segment. The posterior basitarsi are short and very flat, scarcely as long as the next three tarsal subsegments in length.

Holotype male, Douglas County, Kansas, Aug. 23, 1939 (R. H. Beamer); allotype female, same locality, Aug. 23, 1939 (D. E. Hardy). Paratypes; two males, one female, same data Aug. 22-23, 1939 (R. H. Beamer, A. T. Hardy, D. E. Hardy); six males, three females, Cherokee County, Kansas, Aug. 30, 1939 (R. H. Beamer).

PLATE 2


5a
5b
T. floridensis
5c
5d
5e
6a
6b
T. minacis
6c
5f
5g
6d
6e
6f
7a
7b
7c
7d
T. tumida
7e
7f
8a
8b
T. turgida
8c
8d
8e

Tömösváryella floridensis n. sp.

(Plate 2, Figs. 5a-5g)

This species is related to **toxodentis** (Hardy-Knowlton), the two are readily separated by comparing the tooth-like developments of the posterior trochanters and the male hypopygia.

Male: Almost entirely black, sparsely pilose species. **Head:** Antennae yellow-brown to brown, third segment long acuminate (fig. 5a), first two sections of the arista pale. Eyes joined on upper portion of front for about one-half the length of the frontal triangle. Face silvery pubescent; front, below the junction of the compound eyes, faintly gray to silvery; upper portion of front and vertex shining black. Occiput subshining, only faintly gray dusted above, cinereous on the sides and lower portion; posterior margin of eyes slightly indented on upper half so that the portion of the occiput above is more swollen. **Thorax and abdomen:** Shining metallic black in ground color, very faintly dusted; pleurae and metanotum more grayish, sternopleurae shining on lower portions, humeri and halteres bright yellow. Legs chiefly black, apices of femora and tibiae, bases of tibiae and first four tarsal subsegments yellow. Femora moderately thickened, with two rows of strong spines on apical halves below; anterior femora each with two long flexor bristles near bases below; middle coxae with a transverse row of long slender, downward directed bristles at their apices, above. Posterior trochanters each with a distinctively shaped tooth-like projection on under sides near apices; this tooth directs downward for about half its length then abruptly narrows and slants towards the base of the trochanter (fig. 5b). Tibiae almost straight, only slightly bowed; basitarsi equal in length to the next three tarsal subsegments. **Wings:** Hyaline very faintly iridescent, third section of costa little less than one-half the length of the fourth; fifth costal section twice as long as third and fourth combined. Crossvein r-m situated at or slightly

EXPLANATION OF PLATE 2

Fig. 5. Tömösváryella floridensis n. sp.
a. antenna; b. hind trochanter of male; c. wing; d. ninth segment and harpagone, lateral view; e. male hypopygium, dorsal; f. posterior portion of male abdomen, ventral; g. male abdomen, lateral.

Fig. 6. Tömösváryella minacis n. sp.
a. hind trochanter of male; b. male hypopygium, lateral; c. male hypopygium, ventral; d. wing; e. female abdomen, lateral; f. male hypopygium, dorsal view with abdomen dissected away.

Fig. 7. Tömösváryella tumida n. sp.
a. antenna; b. hind trochanter of male; c. wing; d. male hypopygium, ventral; e. male hypopygium, dorsal; f. female abdomen, lateral.

Fig. 8. Tömösváryella turgida n. sp.
a. antenna; b. hind trochanter of male; c. male hypopygium, ventral; n. female ovipositor, lateral; e. male abdomen, dorsal.

beyond the end of vein R1 and just before the middle of the discal cell. Last section of fourth vein (M_{3+4}) slightly curved, longer than the third section of that vein (from r-m crossvein to m-cu); posterior crossvein (m-cu) longer than last section of the fifth vein (cu_1) (fig 5c). **Abdomen:** Sides but gently rounding, widest at segments two to four; the posterior portion of the abdomen is strongly bent downward. Fifth abdominal segment longer than the fourth, hypopygium about equal to the fifth in length. **Hypopygium** With a distinct vertical keel at apex, above (fig. 5g) and a large median cleft area extending from the base almost to the keel from dorsal view (fig 5e). The apical portion of the hypopygium is less heavily sclertized and densely covered with short microscopic setae; this area seems to be formed by an out folding of the eighth segment. From ventral view the ninth segment is deeply cleft, the cerci are large and rounding and the harpagones rather narrow and enlarged at their tips (fig 5f); from lateral view it is seen that the claspers are very flat, enlarged and rounding apically (fig 5d); harpagones yellowish in color.

Length: body, 2.6-2.9 mm.; wings, 2.6 mm,

Female: The association of the females is not at all certain, the specimens apparently belonging to this species run to **toxodentis** (Hardy-Knowlton) and cannot be conveniently separated from that species by structural characters. The third antennal segment is yellowish instead of black and the bristles of the middle coxae are stronger and black, being bright yellow in **toxodentis.** The front of the female is entirely silvery and sunken between the eyes; base of ovipositor rather rounding, piercer much longer than base and very slender, reaching to about the middle of the third abdominal segment.

Holotype male, Hilliard, Florida, Aug. 6, 1939 (D. E. Hardy); allotype female and four paratypes, 3 males, 1 female, same data as holotype; one paratype male, one female, Adel, Ga., Aug. 11, 1939 D. E. Hardy-J. D. Beamer); one paratype male, Okefenokee Swamp, Ga., Aug. 1, 1939 (A. Hardy); and one paratype male, Honey Island, Okefenokee Swamp, Ga., June 1, 1912, (Cornell Univ. Expedition.)

One paratype being returned to Cornell University.

Tömösváryella minacis n. sp.

(Plate 2, Fig. 6a-6f)

This species is related to **similis** (Hough) but is readily separated by the development of the male clasping structures; the strongly carinated area on the dorsum of the outer clasper, the smaller carina of the inner and the broadened apices of these structures will distinguish it; the r-m crossvein is also situated at or slightly beyond the middle of the discal cell, instead of before the middle as in **similis.**

Male:—Head: First two segments of antennae black, bristles of

second segment short; third segment acuminate, like **similis** in shape, brownish in ground color, densely white pubescent. Face silvery, frontal triangle silvery with a light golden tinge, upper portion of front, above junction of eyes, and vertex shining black; upper portion of occiput subshining, sides silvery. **Thorax**: Shining in ground color, brownish dusted on dorsum of mesonotum and scutellum, rather lightly grayed on margins of mesonotum, distinctly gray pollinose on metanotum and upper portions of pleurae. **Legs**: For the most part, as in **similis**, the bristles of the mid-coxae are strong and yellowish to brown in color; the hind trochanters possess three to four small but distinctly visible hairs on under side near their bases and a medio-ventral patch of dense microscopic pile; this patch is located on a slightly raised area (fig. 6a), this is not distinctly tuberculate as in the **vagabunda** group. **Wings**: Lightly iridescent, third section of costa about one-half the length of the fourth; fifth section not quite twice the length of the third and fourth combined. Crossvein r-m situated well beyond the end of vein R_1, and slightly beyond the middle of discal cell. Ultimate section of fourth vein straight or nearly so, last section of the fifth about equal to the posterior crossvein in length (fig. 6d). **Abdomen**: Chiefly shining, only lightly dusted, sides but slightly rounding; fifth segment one and one-third times as long as the fourth. **Hypopygium**: About three-fourths the length of the fifth segment of abdomen, the longitudinal groove located just to the left of the median line, membranous apex plainly visible and sometimes extruded. The claspers are developed dorsally into strong carinae, more pronounced on the outer clasper (figs. 6b, 6c, and 6f), both claspers are bluntly pointed, the inner one is more slender and larger of the two and is scarcely curved inward at its apex; the outer is more stout and gently curved inwards at its apex; neither clasper is concave on the inner margin as in **similis**.

Length: body, 2.6 mm.; wings 2.6 mm.

Female: Differs in having the third antennal segment distinctly yellow, the front is silvery pollinose to the vertex, wider and distinctly concave in the middle. Crossvein r-m is siuated at end of vein R_1 and distinctly before the middle of discal cell. Flexor spines of femora more developed, hind tibiae dilated on apical halves and tarsi more flattened. Base of ovipositor short and round, piercer slender, twice as long as base (fig. 6e), reaching to apex of second abdominal segment.

Length: body and wings, 2 mm.

Holotype male, Key Largo, Florida, July 10, 1939 (A. T. Hardy); allotype female, same data; paratypes: three males, Hilliard, Florida, July 24, 1939 (D. E. Hardy); Plant City, Florida, Aug. 15, 1930

(J. Nottingham) and Griffin, Ga., Aug. 12, 1939 (R. H, Beamer),

The holotype and allotype were collected in roadside grasses, **Deltocephalus flavicosta** was the most common leafhopper taken.

Tömösváryella tumida n. sp.

(Plate 2, Figs. 7a-7f)

This species is related to **Vagabunda** but is readily separated by the male genital structures.

Male: Head: First two segments of antennae brown to black, third segment brown, with a distinct yellow tinge in ground color and terminating in a slender acuminate point below (fig. 7a). Face silvery, frontal triangle golden; front, above junction of eyes, black. Eyes joined for less than one-half the length of the frontal triangle. **Thorax:** Metallic black in ground color, dusted with brown on the dorsum, faintly grayish on the upper portions of the pleurae, metanotum and margins of mesonotum; dorsocentral hairs weak. Legs chiefly black, narrow apices of femora and tibiae, broad bases of tibiae and first four tarsal subsegments yellow, apical subsegments of tarsi brown. Femora rather slender, spines very weak; front femora each with two small flexor bristles near bases; middle coxae with three to four strong apical bristles; hind trochanters with a distinct mound-like development on the under sides near apices (fig. 7b), this is fringed with dense white pile. Hind tarsi almost straight, with just a slight curvature; tarsi slightly flattened, basitarsi about equal to the next four tarsal subsegments in length. **Wings:** Distinctly infuscated and iridescent, third section of costa less than one-half the length of the fourth; fifth section about equal to the third and fourth combined. Crossvein r-m situated at the end of vein R_1 and well before the middle of the discal cell. Ultimate section of fourth vein almost straight, last section of fifth vein about equal to posterior crossvein in length (figs. 7c). **Abdomen:** Polished black only very faintly dusted on the dorsum, the ground color scarcely obscured; rather short, but little longer than the thorax, the sides gently rounding, widest at segment three. **Hypopygium:** Slightly compressed to the right, the longitudinal groove is just to the left of a median line, the membranous apex is distinct and slightly protruded; hypopygium about three-fourths the length of the fifth segment (fig. 7e). From ventral view the ninth segment is but little longer than wide, with a deep V-shaped cleft for almost half its length on posterior margin. Harpagones broad and strongly developed, asymmetrical, the inner clasper being the larger of the two; these are rather acutely peinted on inner apices, distinctly concave on inner margins and each with a pronounced nitch near bases on outer margins (fig. 7d).

Length: body, 2.5 mm.; wings, 2.4 mm.

Female: Front chiefly silvery with only extreme upper portion, just below vertex, shining black; third segment of antennae more distinctly yellow; flexor bristles at bases of front femora more distinct than in male, bristles of middle coxae weaker; posterior trochanters without tubercles but with a patch of short hairs below, near bases; tarsi more flattened. Base of ovipositor globose, piercer almost twice as long as base and reaching just past the apical margin of the second abdominal segment. (fig. 7f).

Holotype male, Belle Glade, Florida, July 18, 1939 (D. E. Hardy); allotype female and seventeen paratypes, ten males, seven females, same data as type (R. H. Beamer, D. E. Hardy and A, T, Hardy); four males, eight females, Vero Beach, Fla., July 22, 1939 (D. E. Hardy, A. T. Hardy and R. H. Beamer); one male, Clayton, Ga:, May 18-26, 1911, 2,000 ft. (J. C. Bradley); one male, Douglas County, Kansas, Aug. 27, 1939 (R. H. Beamer) and three males, two females, Garnett, Kansas, August 29, 1939 (R. H. Beamer).

One paratype returned to Cornell University.

Tömösváryella turgida n. sp.

(Plate 2, Figs. 8a-8e)

This species belongs in the **vagabunda** group by having the posterior trochanters of the male tuberculate, it is separated from other members of this complex by the shape of the trochanteral development and the male genital structures.

Male: Head: Face and frontal triangle silvery, front shining black above junction of eyes; compound eyes joined for about one-third the length of the frontal triangle. Antennae brown to black, third segment acuminate (fig. 8a), rather thickly white pubescent; bristles of second segments short. **Thorax** and **Abdomen:** Polished in ground color, rather heavily gray to brown pollinose; margins of mesonotum and scutellum with distinct hairs, dorsocentral hairs strong; abdomen almost bare. Legs chiefly black, apices of femora and tibiae, bases of tibiae and first four tarsal subsegments yellow, apical subsegment of tarsi brownish. Femora moderately thickened, spines weak, strongest on mid-femora; front pair each with a pair of flexor bristles near bases; middle coxae with three to four long yellow bristles apically. Posterior trochanters armed with a large blunt process in middle on their under sides, this development is about as long as the thickness of the trochanter at apex and about as thick as the trochanter at base (fig. 8b). Hind tibiae enlarged apically; hind tarsi flattened laterally, basitarsi about equal to next four tarsal subsegments. **Wings:** The third costal section is about one-third the length of the fourth; the fifth is about one and one-half times the length of the third and fourth combined. Crossvein r-m is situated much beyond the end of the vein R_1 and at the middle of

discal cell. Last section of fourth vein almost straight, last section of fifth slightly shorter than the posterior crossvein. Abdomen slender, slightly bulged at segments two and three and narrowing gradually towards the hypopygium; fifth abdominal segment but little longer than the fourth. **Hypopygium:** Almost equal to the fifth segment in length, eighth sclerite rather sharply pointed at apex on the right; apical depression very distinct and about in the middle; longitudinal groove slightly to the left of a median line; the membranous area is not protruded (fig. 8e). Ninth segment rather deeply V-shaped cleft on hind margin, longer than wide; claspers fairly simple, almost symmetrical, widely diverged towards their apices, not paralleled as in most species (fig. 8c).

Length: body, 2.8 mm.; wings, 2.7 mm.

Female: The association of the female cannot be certain, the specimens at hand apparently belong here. The front is silvery to the vertex; hind trochanters are normal in shape, tarsi more flat and dilated. Base of ovipositor subglobose, piercer longer than base (fig. 8d) reaching beyond the apex of second segment.

Holotype male, Griffin, Ga., Aug. 12, 1939 (D. E. Hardy); allotype female same locality and date (A. T. Hardy). Paratypes; six males same data, (R. H. Beamer, A. T. Hardy, J. D. Beamer); one male, College Station, Texas, June 23, 1938 (R. I. Sailer); one male Mildred, Kansas, Aug. 31, 1939 (R. H. Beamer); two males, Garnett, Kansas, Aug. 29, 1939 (R. H. Beamer), five males, Cherokee County, Kansas, Aug. 30, 1939 (R. H. Beamer); two males, Douglas County, Kansas, Aug. 26, 1939 (R. H. Beamer) and one male, Barberton, Ohio, Aug. 10, 1936 (L. J. Lipovsky):

A DISTRIBUTIONAL NOTE ON ACHALARUS LYCIADES (GEYER)

(Lepidoptera: Hesperiidae)

This species already known to occur from southern New England to the Gulf and west to eastern Texas and southwestern Missouri has been found by the present writer to be rather abundant in Leavenworth and Douglas counties, Kansas during the latter part of May for the past several years (see Vol. 13, p. 28 of this Journal). A number of specimens were also taken by the writer in the Wichita Mountain National Forest, Oklahoma and at Romney in Eastland County, Texas. The Wichita Mountaiin material was collected on June 28, 1936 and the Romney specimens on June 30th and July 1st of the same year. These records extend the known frontier of the species some three hundred miles we tward.

WILLIAM D. FIELD, Lawrence, Kansas

NEW AND LITTLE-KNOWN SPECIES OF ALLOEORRHYNCHUS (HEMIPTERA: NABIDAE).

Halbert M. Harris, Ames, Iowa

It has been now more than thirty years since the appearance of Reuter and Poppius's intensive study of the genus **Alloeorrhynchus.** In continuation of my efforts to organize and extend our knowledge of this and other groups of Nabidae it seems desirable to present the following description and notes. The subgenus **Psilistus** has been discussed elsewhere (Proc. Royal Ent. Soc. London, (B), 6: 191-196, 2 figs., 1937).

Alloeorrhynchus venator, n. sp.

Obovate, the abdomen strongly widened to its middle; setose and also distinctly pilose. Shiny, only the metapleuron, scutellum, and the part of clavus interior to its inner row of punctures dull. Prothorax, except hind lobe of pronotum, and abdomen, except base and apex, first antennal segment, distal three segments of rostrum, all coxae and trochanters, base and extreme apex of all femora, and a more or less broad sometimes indistinct band around midddle of all tibiae, luteous to golden yellow; the head, posterior lobe of pronotum (except irregular front margin), scutellum, clavus and apical half of corium, base and apex of abdomen and bands on femora and tibiae piceous to fuscous black. Head broader than long (21:15), unicolorous black, or paler on tylus and gula; the tylus prominent. Vertex fairly broad (9), barely raised above margin of eye. Ocelli almost twice as far apart as from eyes. Eye proportions, l:w:d= 9:6:10. Antennae infuscated; segment I paler, except at base, II, III and IV rather thickly clothed with short, semi erect hairs; proportions, 11:2+21:19:20. Rostrum fairly long, segment I piceous, II extending between front coxae; proportions, II:III:IV=18:14:7.

Pronotum barely broader than long (34:33), the collar rather distinct, ring-like; the sides sub-parallel along basal half of anterior lobe, the disc rather evenly convex, front lobe more than twice as long as hind lobe (24:10). Scutellum bifoveate and irregularly rugose on the disc, the sides moderately swollen, the apex shiny, blunt, paler. Hemelytra greatly reduced, not contiguous behind scutellum, conspicuously pilose, the clavus with two rows of punctures; the corium entirely shiny, its basal half whitish testaceous; membrane evident, not reaching hind margin of second abdominal segment. Abdomen strongly widened to its middle, the second segment above coarsely punctate and more or less infuscate, the apical segment and genital segments, above and beneath, dark to piceous. Anterior and intermediate femora ampliated and armed beneath as in related forms; the anterior femora measured within about two and a half

times as long as deep (34:11), their tibiae rather strongly widened, the fossorial pad moderately long (11). Ostiolar canal curved posteriorly, its apex broad and blunt. Venter convex, somewhat infuscated on each side at the base, the connexivum semi-erect, sometimes infuscated along the hind margin of the distal four or five segments. Male genital segment slightly asymmetrical, the left clasper (fig 1d) very large, its tip recurved, the right clasper (fig. 1c) distinctly shorter than left.

Length: male, 5.1 mm.; female, 6.0 mm. **Width:** pronotum, 1.6 mm.; abodomen, 2.3 mm.

Holotype, apterous male, Verulam, Natal, S. Africa, 4-7-97; and **allotype,** apterous female, Verulam, S. Africa (British Museum of Natural History). **Paratypes,** a male taken with holotype, and a male and female, Karkloof, Natal, S. Affrica (British Museum and author's collection.

It should be noted that the amount of infuscation, especially of the basal abdominal segment, connexivum and tibiae and tarsi is variable. The hairs of the hind tibiae are fine, short and semiprostrate. In the Karkloof male the hind tibiae are much bowed.

Alloerrhynchus elegans Reuter

1882 **Alloeorrhynchus elegans** Reuter, Ofv. Finska Vet.- Soc. Forh., 25:32,63.

1909. **Alloeorrhynchus elegans** Reuter et Poppius, Acta Soc. Sci. Fenn., 37 (No. 2): 34, 38.

Female: head width, 19; vertex, 7. Eye proportions, l:w:d=9:6:10. Antennal formula, 9:2+20:17: (IV missing). Pronotum broader than long (38:34), the anterior lobe much longer than posterior (21:13). Rostral formula, II:III:IV=18:11:5. Anterior femur (measured beneath) slightly less than three times as long as deep (25:9). Anterior tibiae very strongly widened at apex, the length of the apical fossa (13) greater than depth of femur (fig. 2b).

Length: 5.67 mm. **Width:** pronotum, 1.7 mm.; abdomen 2.0 mm.

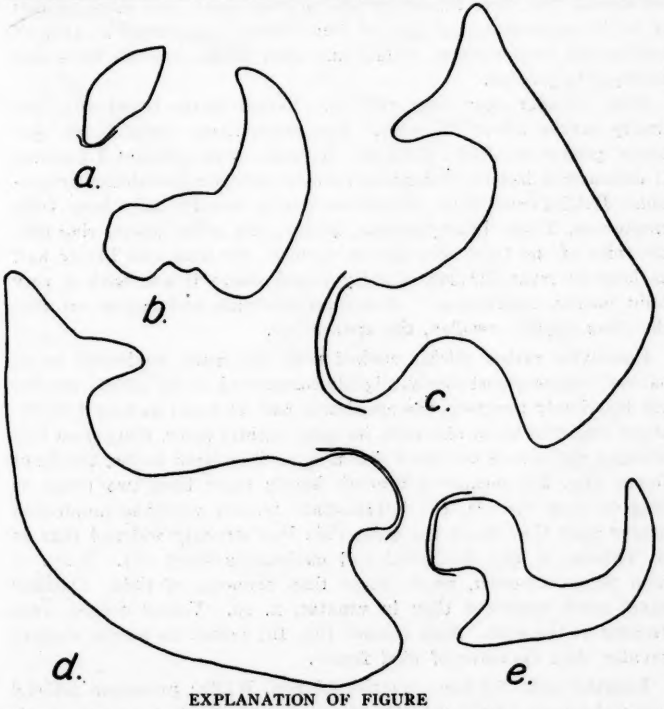
This species is represented in the British Museum material before me by four macropterous specimens from Durban and Malvern, S. Africa, and Matzoro Lakes, Gombe, N. Nigeria, Jan. 1929, Dr. Ll. Lloyd. Because of color variations in this and related species, a new study of the types is greatly needed. In the present specimens the head and hind lobe of pronotum (except lateral margins) are piceous black. The hemelytra are slightly shiny throughout. The apical two-fifths of clavus, a broad band occupying all of distal two-fifths of corium (except the outer apical angle), and a much narrower oblique band along the distal margin of corium, connecting these two are dark fuscous brown. The membrane is pale on basal half and has a large, rounded pale spot at the apex. The dark band on the

anterior femur is indistinct above, and is narrower than in related species, scarcely occupying more than a third of the length of the femur. The clavus is serially punctate but the corium not punctate. The male is smaller than the female and the clasper (fig. 1a) is minute, barely longer than diameter of hind tibia.

Alloeorrhynchus distanti, n. name

1909 **Alloeorrhynchus collaris** Distant, Ann. Soc. Ent. Belg., 53: 374.

Unfortunately the **Prostemma collare** of Mink (1859) proved to be an **Alloeorrhynchus** and now stands as a synonym of **Alloeorrhynchus flavipes** (Fieber) 1836. This usage thus preoccupies the name in the genus making a new name necessary for Distant's form from India. I therefore propose the name **Alloeorrhynchus distanti** for **A collaris** Distant.



EXPLANATION OF FIGURE

Figure 1. Genital claspers of the males (drawn to same scale).
a. Right clasper of **Alloeorrhynchus elegans** Reuter; b. right clasper of **A. gregalis** Harris; c. right clasper of **A. venator** Harris, n. sp.; d. left clasper of **A. venator** Harris, n. sp.; e. right clasper of **A. bellipotens** Harris, n. sp.

Alloeorrhynchus gregalis n. sp.

Elongate oval, rather slender, only slightly widened behind; setose and rather strongly pilose. Shiny, the metapleuron, scutellum and hemelytra, except narrow inner border of clavus and the distal half of corium, somewhat dull. Head, basal two-thirds of hind lobe of pronotum, mesothorax and metathorax beneath and apical segment of abdomen and genital segments piceous to black; scutellum, clavus, a fairly large diamond-shaped spot on the distal part of corium, except triangular area in outer apical angle, and membrane dark fuscous to black; prothorax above and beneath, except basal two-thirds of pronotum, and venter, except apex, luteous to golden yellow. Basal half of corium and its outer apical angle whitish to yellowish-testaceous. Antennae dark testaceous to fuscous, the basal segment pale. Legs testaceous, the front femur, except at base, apex, and more or less of its dorsal surface, the apex of front tibiae, broad rings at apex of middle and hind femora, middle and hind tibiae, and all tarsi embrowned to piceous.

Head broader than long (19:15). Vertex fairly broad (9), distinctly arched above the eyes. Eye proportions, l:w:d=8:5:9. Antennal proportions, 9:2+20:20:20. Rostrum with segment I piceous; II embrowned basally, extending between anterior acetabula; proportions, II:III:IV=16:13:6. Pronotum barely broader than long (macropterous, 37:35; brachypterous, 34:32), the collar short, ring-like, the sides of the front lobe almost parallel, the hind lobe barely half as long as front (11:24), slightly raised above it and with a very faint median impression. Scutellum bifoveate and rugose on disc. the sides slightly swollen, the apex shiny.

Hemelytra rather thickly clothed with fine, pale, semi-erect hairs, narrow, tapering posteriorly, slightly constricted at the middle, the clavas biseriately punctate, the membrane half as broad as long (25:50), about attaining tip of abdomen, its apex slightly paler. Four front legs widened and armed on femur and tibia as in related forms, the front femur (fig. 2d) measured beneath barely more than two times as long as deep (25:12), the intermediate femora with the ampliation nearer apex than base; the front tibia less strongly widened than in **A. venator**, n sp., the apical pad moderately short (7). Hairs of hind tibiae sub-erect, much longer than diameter of tibia. Ostiolar canal much narrower than in **venator**, n. sp. Venter convex, constricted at the base. Male clasper (fig. 1b) broad, its length slightly greater than diameter of hind femur.

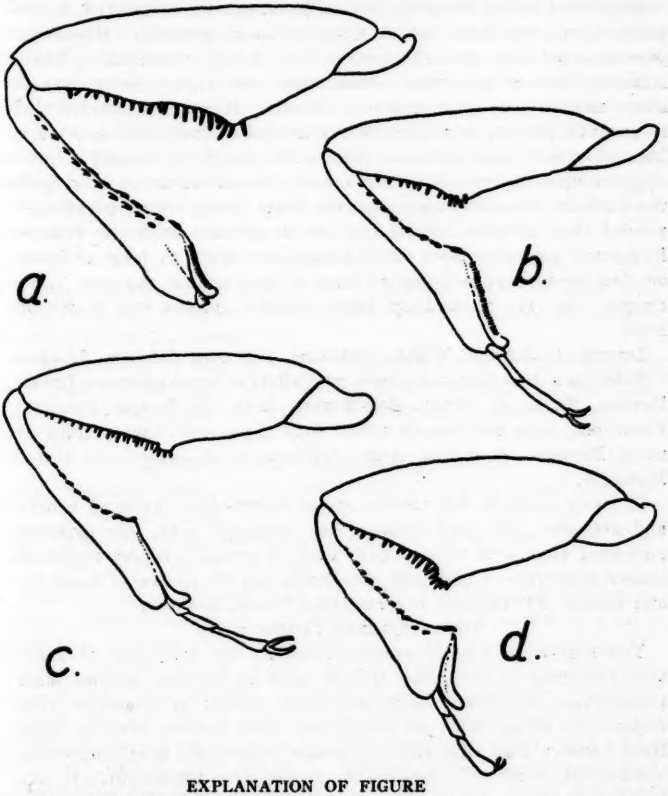
Length: male, 5.0 mm.; female, 6.0 mm. Width: pronotum 1.45-1.6 mm.; abdomen, 1.6-2.0 mm.

Brachypterous form: Hind lobe of pronotum slightly less arched than in winged form. Hemelytra strongly reduced, the membrane

small, oblique, scarcely extending beyond apex of corium, its tip barely reaching to base of fourth segment of abdomen.

Holotype, macropterous male, P. Town, South Africa, and **allotype**, macropterous female, Port Shepstone, S. Africa (British Museum of Natural History), **Paratypes**, macropterous female, Port Shepstone. Natal, 5-'97; macropterous female, Verulam, S. Africa, 4-7-'07; and brachypterous male and female, Malvern, Natal, S. Africa.

In color markings this species is very similar to **A. venator**, n. sp., differing principally in that the coloring of the front lobe of



EXPLANATION OF FIGURE

Figure 2. Anterior femur and tibia as seen from the side (drawn to same scale). a. **Alloeorrhynchus furens Harris**, n. sp.; b. **A. elegans** Reuter; c. **A. flavolimbatus** Kirkaldy; d. **A. gregalis** Harris, n. sp.

the pronotum is continuous over the transverse impression and conspicuously encroaches upon the hind lobe, and that the base of the abdomen on each side beneath and the connexival segments are without distinct darker markings. Also the apex of the corium at the outer angle is pale. In form it is distinctly more slender and the eyes are smaller, the hemelytra of the brachypterous form are more strongly developed, the anterior tibia is less strongly widened distally, the ostiolar canal is narrower and the male clasper is much smaller and of entirely different nature.

Alloeorrrynchus bellipotens, n. sp.

Size, color, and vestiture about as in **A. venator**, n. sp., and **A. gregalis**, n. sp., the body not as elongate as in **gregalis**. Humeri of pronotum pale, the disc of posterior lobe deeply infuscated to black. Anterior lobe of pronotum, connexivum and venter paler than in above named species, more nearly flavous. Hemelytra broader than in **gregalis** and not so noticeably constricted as there, the pale markings of corium less extensive, internally not going beyond a point opposite apex of scutellum. Eyes and antennae about as in **gregalis** the anterior femora longer and the front tibiae more greatly expanded than in that species but not so greatly as in **A. venator**. Membrane attaining apex of abdomen, not twice as long as broad, or (brachypterous) reaching to base of first genital segment. Male clasper (fig. 1e) moderately large, slender, curved into a distinct hook.

Length: 4.4-5.2 mm. **Width**: pronotum, 1.52 mm; abdomen, 2.00 mm.

Holotype: brachypterous male, and **allotype** brachypterous, female, Durban, Natal, S. Africa, Bell-Morley, 1911 (In British Museum). **Paratypes**, male and female taken with types and macropterous female, Emmons, S. Africa, Aug. (collections of author and British Museum).

In many respects this species seems intermediate between **venator** and **gregalis**. The pale humeri, less infuscate legs, less extensive pale area at base of corium, dark apex of corium, broader pronotum, longer hemelytra in brachypterous form, and the nature of front legs and clasper differentiate it from those forms, however.

Alloeorrhynchus furens, n. sp.

Yellowish-testaceous to sordid-testaceous, the hind lobe of pronotum, excluding an irregular, sinuate band at its base, piceous black. Connexivum maculate. Legs indistinctly darker at middle of front femora, on apical third of middle and hind femora, and on tibiae. Head broader than long (22:17), darker around the basal impression. Vertex flat, wide (8). Eye large; proportions, l:w:d=10:7:11. Antennae testaceous, the first segment paler at base and extreme apex; proportions, 11:2+21:21:24. Rostrum pale, the first segment embrowned; proportions, II:III:IV=23:16:6.

Pronotum broader than long (47:38), the anterior lobe pale with an oblique dark cresentic spot on each side of middle in front, much longer than posterior lobe (24:14); posterior lobe arched, slightly impressed within the humeri, the pale area along hind border widened at the middle and on the humeri. Scutellum bifoveate, rugose, dusky, the sides (indistinctly) and the apex paler. Hemelytra brownish testaceous, the basal half of the clavus, except along the claval vein, and three spots on costal margin of corium (an elongate, posteriorly widened one along the basal two-fifths, a triangular one occupying the outer apical angle, and a small irregular circular one between the other two but nearer the first) indistinctly paler. Membrane smoky, translucent. Anterior femur (fig. 2a) with the ampliation slightly nearer base than apex, less than three times as long as deep (34:12), irregularly infuscated on each side. Anterior tibia rather suddenly but only moderately widened at apex, the fossorial pad short (8). Posterior tibia stout, its hairs oblique, and slightly longer than its diameter. Meso- and metapleura embrowned to fuscous, the ostiolar canal narrow. Venter pale, the base slightly embrowned on each side; connexivum with the outer apical angle of the last five segments darkened, the apical ones rather indistinctly.

Length: 6:8 mm. **Width:** pronotum, 2.1 mm.; abdomen, 2.3 mm.

Holotype: female, E. Africa, Rd. to Kilossa, Usagara Dist., Dec. 22-26, 1910, S. A. Neave. (British Museum). **Paratypes,** 2 females, Durban, Natal, S. Africa, 1897.

The species is recognized by its large size, the pale basal band on hind lobe of pronotum, the infuscated hemelytra and legs, the position of the ampliation on front femur and the nature of fore tibiae and eyes.

Alloeorrhynchus flavolimbatus Kirkaldy

1908 **Alloeorrhynchus flavolimbatus** Kirkaldy, Proc. Linn. Soc. N. S. Wales, 32:781.

1909 **Alloeorrhynchus flavolimbatus** Reuter et Poppius, Acta. Soc. Sci. Fenn; 37 (2): 35, 42.

Female: Head broader than long, the tylus convex and raised basally. Vertex flat, wide (3); gula convex. Eyes moderate, 8:6:10. Antennae, 10:2+20:21:22. Rostrum stout, the second segment extending between front coxae; proportions, 22:16:6. Pronotum broader than long (41:35). Clavus biseriately punctate. Anterior femora (fig. 2c) with a few piceous granules along basal half, the distal half, regularly, seriately dentate, measured within, only three times as long as deep (30:10). Anterior tibiae strongly widened distally, the inner edge only slightly curved, the apical pad very long (14). Venter piceous black, broadly pale at the middle on basal half. Abdomen above orange yellow basally.

I have a female example, Brisbane, Australia, June 7, 1915, Henry Hacker, collector. This specimen agrees well with Kirkaldy's color description. There is also at hand a carded female example (British Museum), Kokoda, Papua, 1200 ft., Sept. 1933, L. E. Cheeseman. This example differs from the Brisbane one in that the femora are golden and the venter is entirely black and probably can be no more than a variety of Kirkaldy's form. It should be noted that this Papua example agrees rather perfectly with the description of **A. nietneri** Stein from Ceylon. Males of these forms will have to be studied in order to understand their relationship.

Alloeorrhynchus instabilis, n. sp.

Slightly smaller and slenderer than **A. flavolimbatus** Kirkaldy; the vestiture, color and morkings much as in that species. Head, pronotum, propleura, mesothorax on sides and beneath, and abdomen, except at middle beneath and spots on connexival segments, shiny, piceous black. Scutellum, clavus, distal half of corium, and membrane, dull, fuscous black. Basal half of corium, first segment of antennae, rostrum, legs, a large patch at base of venter, and irregular spots on connexivum, yellowish testaceous. Head broader than long (18:15). Eyes, 8:6:10. Pronotum broader than long (35:30), distinctly smoother than in **flavolimbatus**, the front lobe more sharply delimited than there. Scutellum bifoveate, the sides swollen, the apex distinctly produced and pointed. Clavus with two rows of punctures, paler basally next to corium. Corium shiny along costal margin, more broadly so along basal third, without distinct punctures. Membrane paler at inner basal angle. Antennal proportions, 10:2+21:20:26; the distal segments fuscotestaceous. Rostrum long, pale, proportions, 22:15:6. Anterior femora slender, widened at basal third and conspicuously armed from there to apex, as measured within three times as long as deep (27:9). Intermediate femora denticulate within on distal half. Hind femora slightly darkened on apical third. Front tibia long, slender, only slightly widened distally, the apical pad shorter than diameter of femur (7:9). Hairs on hind tibia shorter than diameter of tibia. Venter shiny.

Length: 5:13 mm. **Width:** pronotum, 1.52 mm.

Holotype: macropterous female, Gordon Vale, Queensland, Australia, E. Allen, 1935 (author's collection).

The species is recognized by its more slender form, pale basal two-thirds of inner cell of corium, long rostrum, and slender front femora and tibiae.

Alloeorrhynchus incertus, n. sp.

Color and pattern as in **A. flavolimbatus** Kirkaldy, but the body stouter and the appendages much shorter. Eyes slightly smaller than in **A. instabilis**, not so prominent. Antennae fuscotestaceous,

segments I and II paler except at their distal ends; proportions, 9:2+ 18:17:19. Rostrum embrowned, very short and stout; proportions, 12:10:4. Pronotum much brrader than long (36:28), the sides strongly sinuate, the disc of hind lobe somewhat paler than humeri and disc of front lobe. Scutellum noticeably smaller than in **flavolimbatus**, and not so strongly swollen along the sides. Hemelytra narrowed distally, the sides straight, not constricted as in **flavolimbatus** and **instabilis**, the clavus punctate as in those forms, but the corium also with a row of coarse punctures. Margin of anterior acetabula pale, the front tibiae and femora, and a distal ring on middle and hind femora embrowned. Front femora short, stout (24:10), widened at the basal third, the spinules from there outwards much smaller than in **flavolimbatus**. Intermediate femora angularly ampliated and armed about as in related forms. Hind tibiae stout, pilose and setose, the longer hairs semi erect and longer than diameter of tibia. Connexivum pale, the hind margins of the distal five segments piceous brown. Venter piceous, the genital valves paler.

Length: 5:12 mm. **Width**: pronotum, 1.56 mm; abdomen 1.83 mm.

Holotype: Macropterous female, Brisbane, Queensland, Australia, February 24, 1924, H. Hacker, (author's collection).

The species differs in color from **flavolimbatus** Kirkaldy in that the front legs are more embrowned, the corium is embrowned at the base and its pale area is widest distally. In Kirkaldy's species the extreme base of corium is pale and the pale area widens to its middle then tapers outwardly. Also in that species the first two dark spots on connexivum tend to converge. The shiny costal area of the corium is greater in extent and the ostiolar canal is smaller and more slender in the new species than in **flavolimbatus**.

A DISTRIBUTIONAL NOTE ON HETEROCHROA BREDOWII (GEYER).
(Lepidoptera: Nymphalidae)

Heterochroa bredowii bredowii (Geyer), typically found in southern Arizona and in Mexico was observed by the present writer to occur at Concan in Uvalde County, Texas and Leaky in Real County, Texas on July 7th and 9th, 1936. A number of specimens were seen and a few specimens were captured. Among these were a number of freshly emerged specimens. This extends the known distribution of the butterfly some four hundred or more miles to the east. Recently a single female specimen of this species was found near Scott City, Kansas (see elsewhere in this Journal) but it can only be regarded as a visitor in Kansas.

WILLIAM D. FIELD, Lawrence, Kansas

A FIELD METHOD FOR ESTIMATING MORMON CRICKET INJURY TO FORAGE

Ralph B. Swain[1]
Bureau of Entomology and Plant Quarantine

In numerous localities in the Northwestern States the Mormon cricket (**Anabrus simplex** Haldeman) has been so abundant during the past several years that concern as to the effect of their feeding upon range forage plants has been aroused. Mormon cricket injury to crop plants (plants of one species, of a rather uniform density, height and weight) is fairly difficult to estimate ocularly on a volume basis; injury to range plants is much more so. In the latter case damage to a great variety of species of widely varying heights and volumes must be estimated.

Field observation during the spring of 1938 on the feeding habits of the Mormon cricket indicated that the injury to plants was of a purely mechanical nature, resulting in the removal of portions of the plant tissue, and that in general it commenced at the peripheries, leaf tips, or inflorescences and proceeded toward the centers or lowest above-ground portions of the plants. The resemblance of at least the more severe Mormon cricket injuries to the results of grazing suggested that perhaps methods already developed for estimating forage production and utilization by livestock might be of service in the present instance. It is the purpose of the following discussion to show how the reconnaissance method of range survey may be useful as a means of roughly and rapidly estimating Mormon cricket damage to forage.

"Forage," as a range-management term, is considered to be that portion of the vegetation which is available to and usable by livestock. Although "grazing capacity" (the maximum number of livestock which a range unit will support each season over a period of years without injury to the range and other related land uses and services) is not specifically considered here, it is obviously dependent upon the forage production.

The reconnaissance method is used for determining the grazing capacities of vegetation types. It requires the listing of all forage species present within a type, together with their respective percentages of the plant composition, and the estimation of the density of the type. These are the only data collected in the field with respect to vegetation.

To compute the forage production for the type, the percentage compositions of the plant species must be multiplied by their respective "proper-use factors" and the products added. This sum is then multi-

[1]General Supervisor, Mormon Cricket Control Project, Bureau of Entomology and Plant Quarantine, United States Department of Agriculture.

plied by the density estimate. The proper-use factor of a plant species is the percentage of the total current year's growth within reach of livestock that is utilized when the ranges are properly grazed. These factors are average figures, determined by tedious observation and experiment, and published in tabular form for use in range surveys by the Division of Range Research of the United States Forest Service and cooperating Federal and State agencies. The procedure for determining grazing capacities is not the concern of this paper. It is described in a mimeographed pamphlet entitled "Instructions for Range Surveys."[2] For our purpose it is necessary to follow this procedure only to determine the forage production on a given area. The necessary field data are those which would be collected through an ordinary reconnaissance survey, with the addition of estimates of the average percentage utilization by the Mormon cricket of each major forage-plant species composing the vegatation type examined. Since, in the present instance, cricket utilization is to be compared with the proper livestock utilization on the same area, density need not enter into the computation.

Table 1 illustrates how data from field observations on a 1-10th acre plot in Elko County, Nev., were arranged in order to compute the loss of forage due to Mormon cricket feeding. The forage species present are listed at the left of the table and the field estimates of percentage composition of the plants and percentage utilization by the Mormon cricket are found in columns 1 and 6, respectively. The percentages of cricket utilization are average figures derived from ocular estimates of the reduction in volume of mature, individual plants.

These ocular utilization estimates for a plant species can be made by multiplying the estimated percentage of plants exhibiting Mormon cricket injury by the estimated average percentage utilization of the indivdual plants. This is the method generally used in the reconnaissance type of vegetation survey. Intensive practice in estimating the utilization of individual plants is necessary before one can achieve reasonable accuracy. Comparisons of injured and uninjured plants of the same stage of development and of about the same original size are necessary. Such plants can usually be found within a very small area at the point of observation. Estimates may also be roughly checked by weighing with a hand scales equal numbers of injured and uninjured plants, and comparing the percentage difference in weights with the percentage utilization estimate made ocularly. Both these methods and others as they are applied to studies

[2]Inter-agency Range Survey Committee, 1937. Instructions for range surveys as formulated by the Inter-agency Range Survey Committee and adopted by the Western Range Survey Conference, April 24, 1937. (Approved by Chief, U. S. Forest Service, etc.) Mimeographed.

of range-grass utilization have been described and compared in a single paper.[3]

As no density estimates were taken, the figures presented in Table 1 are relative values and, as such, useful to show percentage losses resulting from cricket injury.

Since cattle and horses differ somewhat from sheep and goats in the degree to which they will ordinarily utilize a given plant species under proper range management, there are two sets of proper-use factors, columns 2 and 4. In the table C&H signifies cattle and horses; S&G, sheep and goats; and PUF, proper-use factor. The relative amounts of forage available to the two classes of livestock under proper utilization have been found by multiplying the percentage compositions of the various plants by their respective proper-use factors. The totals of columns 3 and 5 are these relative amounts. The comparative amount of herbage taken by Mormon crickets is the total of column 7, the figures of which were obtained by multiplying the percentages of composition of the plant species by the respective percentages of utilization.

The amounts of forage remaining for livestock after Mormon cricket feeding are the totals of columns 8 and 9, which were obtained by subtracting the weighted cricket-utilization estimates of column 7 from the figures of columns 3 and 5. The difference between the amount of forage remaining for livestock and the total forage originally available is the amount of forage eaten by crickets. The percentages of forage destroyed by crickets are computed by dividing the cricket consumption by the total forage. These are 44 percent for cattle and horses and 48.6 percent for sheep and goats. The proper-use factors of the table were taken from "Proper Use Factor Table, Nevada District No. 1," approved tentatively by the United States Forest Service and other agencies at Reno, Nev., September, 1938.

The 1-10th acre plot for which the figures of Table 1 are given was established about 35 miles northwest of Elko on the Stewart Ranch, Elko County, Nev., June 17, 1938. The vegetation type was shrub with **Artemisia tridentata** and **Chrysothamnus viscidiflorus** the dominant species. Mormon crickets are believed to have been continuously present in the plot from June 1 to June 27 at average concentrations of about five per square yard.

The estimate of Mormon cricket damage to forage plants derived by the reconnaissance survey method does not present the entire picture of the destruction to the total herbage on a range unit. It fails in two respects. Firstly, damage to non-forage species, which occasionally make up a very large proportion of the plant density, is not

[3]Pechanec, J. F., and Pickford, G. D. 1937. A Comparison of Some Methods Used in Determining Percentage Utilization of Range Grasses. Journal of Agricultural Research 54: 753-765.

TABLE I

Mormon Cricket Damage to a Tenth-acre Range Plot in Terms of Relative Seasonal Forage Production Loss for Cattle and Horses and for Sheep and Goats, 1938

Forage species occurring in the plot	(1) Percentage composition	(2) P U F (C&H)	(3) Herbage available to C&H (1)x(2)	(4) P U F (S&G)	(5) Herbage available to S&G (1)x(4)	(6) Percentage utilization by crickets	(7) Herbage taken by crickets (1)x(6)	(8) Forage left for C&H (3)-(7)	(9) Forage left for S&G (5)-(7)
Poa nevadensis	5	80	4.00	60	3.00	10	.50	3.50	2.50
Poa secunda	5	45	2.25	40	2.00	50	2.50	0	0
Oryzopsis webberi	5	55	2.75	50	2.50	50	2.50	.25	0
Sitanion hystrix	10	20	2.00	20	2.00	35	3.50	0	0
Stipa thurberiana	5	60	3.00	40	2.00	35	1.75	1.25	.25
Phlox canescens	5	10	.50	10	.50	5	.25	.25	.25
Artemisia tridentata	40	10	4.00	10	4.00	0	0	4.00	4.00
Chrysothamnus viscidiflorus	25	10	2.50	10	2.50	0	0	2.50	2.50
Totals	100		21.00		18.50		11.00	11.75	9.50

Cattle and horse forage taken by crickets=sum of col. (3) minus sum of col. (8)
=21.00—11.75=9.25.

Forage available to C&H taken by crickets=Forage taken by crickets=9.25=44%.
Forage available to C&H 21.00

Sheep and goat forage taken by crickets=sum of col. (5) minus sum of col. (9)
=18.50—9.50=9.00.

Forage available to S&G taken by crickets=Forage taken by crickets=9.00=48.6%
Forage available to S&G 18.50

shown by this method. Secondly, cricket utilization exceeding the proper-use factor for livestock is not reflected in the percentage of forage destruction. However, for the purpose of evaluating Mormon cricket damage to livestock forage, this may prove a fairly reliable and useful field method.

To Mr. W. R. Chapline of the Division of Range Research, United States Forest Service, the writer is grateful for general suggestions and criticisms. He is grateful to Dr. George Stewart and Mr. Selar S. Hutchings, Intermountain Forest and Range Experiment Station, Ogden, Utah, for generously assisting in the preparation of the table and for critically reading the completed manuscript.

INTRAVENOUS INJECTIONS OF ARSENIC INEFFECTIVE IN CONTROLLING HORN FLIES ON CATTLE

W. G. Bruce
Bureau of Entomology and Plant Quarantine

An experiment has been conducted to determine the possibility of injecting sufficient arsenic into the blood stream of a bovine to make the blood toxic to horn flies (**Haematobia irritans** (L.)) and other blood-sucking flies feeding upon the animal.

A commercial form of trivalent arsenic (meta-amino-para-hydroxyl phenyl arsine oxide), used extensively in antisyphilitic therapy, was used in this test. The arsenical was obtained in powder form, mixed with sufficient alkali and sucrose to make a practically neutral and isotonic aqueous solution. The solution was prepared by dissolving the powder in sterile distilled water.

In a preliminary test 0.06 gram of the arsenical dissolved in 10 cubic centimeters of sterile distilled water was mixed with 120 cubic centimeters of defibrinated bovine blood and fed to 96 caged horn flies. As a check 10 cubic centimeters of sterile distilled water was mixed with 120 cubic centimeters of the blood and fed to 102 horn flies in another cage. In less than 22 hours after the blood was supplied all the flies fed blood containing arsenic were dead, whereas only 5 of those in the check cage were dead. These results led to further tests to determine whether sufficient arsenic could be injected into the blood stream of an animal to render its blood toxic to horn flies.

A 450-pound heifer was confined in a screened building and maintained on a ration of bran and prairie hay. The arsenical was injected into the jugular veins with a sterile glass syringe of 10-cubic centimeter capacity and fitted with a sharp, short-bevel, 21-gage needle. Nine injections of 0.06 gram of the arsenical in 10 cubic centimeters of sterile distilled water followed by ten injections of 0.4 gram in the same quantity of water were given. The first six injections were made at 2-day intervals, the seventh followed a 3-day interval, the eighth 1 day later, and the ninth 2 days thereafter. The 0.4-gram doses followed immediately after the small doses. The first six of these were injected at 2-day intervals, the seventh following a 4-day interval, the eighth on the next day, the ninth 7 days thereafter, and the tenth on the following day.

The animal was periodically infested with horn flies.

A sample of the droppings was collected at least once each day, infested with 100 horn fly eggs, and kept in an individual screen cage in order that adult emergence could be noted.

The arsenical had no apparent effect upon the horn flies feeding on the animal.

The injections of the 0.06-gram doses apparently had a beneficial effect upon the animal, as indicated by an increased appetite, sleek coat of hair, and excellent general condition. The injections of the 0.4-gram doses had no apparent ill effect when given at 2-day intervals, but when injected at 1-day intervals they caused loss of appetite, glassy appearance of the eyes, puffiness around the eyes, unsteadiness of gait, soreness of the leg joints, and poor general condition. The animal remained in poor condition for about 3 weeks following the last injection.

Evidently a large proportion of the arsenical is excreted in the feces and urine, and it is impossible to build up enough arsenic in the blood stream to be toxic to horn flies. Sufficient arsenic was excreted in the droppings to be toxic to horn fly larvae. Adult emergence from the samples of droppings was quite irregular and at times as low as 7 percent.

One day after the last injection the heifer was artificially wounded and infested with approximately 150 larvae (4 to 6 hours old) of **Cochliomyia americana** C. and P., to determine the toxicity of the arsenical to screw-worms. The larvae were developing normally at the end of the third day, when all but about 50 were removed. These larvae completed normal development, pupated, and normal flies emerged. The flies were kept in a screen cage and, in due time, viable eggs were deposited.

The heifer died of blackleg about 2 months after the last injection of arsenic.

A NOTE ON ARGYNNIS CYBELE KRAUTWURMI HOLLAND

(Lepidoptera: Nymphalidae)

Dr. Holland[1] gave the name **krautwurmi** to a supposed new subspecies from the Upper Peninsula of Michigan. The writer has recently studied a series of males from near the type locality. They are not in the least different from typical **cybele** males and the name **krautwurmi** does not represent a distinct subspecies. The specimens upon which Dr. Holland based his description of **krautwurmi**, do, however, represent a dimorphic female form of **cybele** and the name may be retained in this connection. This female form is quite common in Kansas and differs from typical female **cybele** in having a pale buff ground color on the upper surfaces instead of the bright yellowish brown color. Also the basal areas of both wings above are very dark in color in **krautwurmi**.

WILLIAM D. FIELD, Lawrence, Kansas

[1]The Butterfly Book, p. 87, pl. LVI, fig. 2, 1931.

A NEW ENITHARES FOR AUSTRALIA (NOTONECTIDAE-HEMIPTERA)

H. B. Hungerford, Lawrence, Kansas*

Up to the present time there has been recorded for Australia only one species of **Enithares**. This is **Enithares bergrothi** Mont. I have, however, a series of another species that is readily separated in both sexes from **E. bergrothi** Mont., the males by the protuberance on the anterior trochanter, and the females by the broad, middle tibia that has a marked constriction at the base opposite the femoral tooth.

Enithares hackeri n. sp.

Size: Length 9.9 to 10.2 mm.; width at humeri 3.3 to 3.6 mm. It is thus a slightly smaller species than **E. bergrothi** Mont.

Color: Since color is quite variable in the genus, it is possible that the specimens of the type series do not represent the color possibilities. All the specimens at hand are quite light, the scutellum conspicuously so. In the darker specimens, the dark abdomen shows through the hyaline hemelytra. In a similar way, there may be an irregular dark band showing through the caudal portions of the pronotum. The hind femora may be longitudinally striped beneath, as in **E. bergrothi** Mont., and the protuberances on the anterior trochanters of the males may be black.

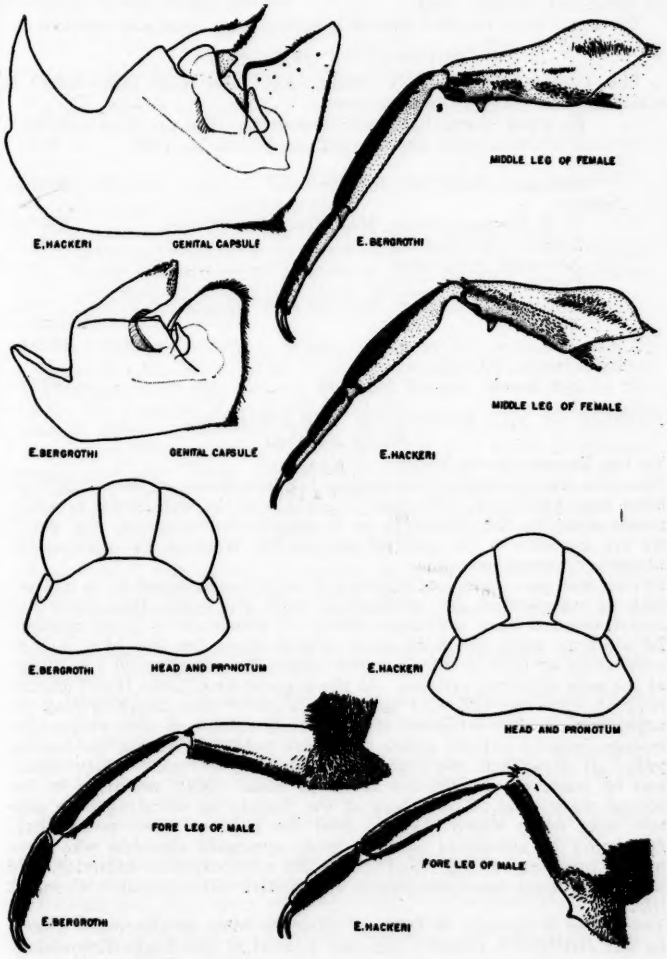
Structural Characters: Head relatively longer, narrower, and less truncate in front than in **E. bergrothi** Mont. The anterior breadth of vertex: synthlipsis:: 43: 23. The length of vertex a little greater than its anterior breadth. The head a little longer than the pronotum. The length of pronotum: length of scutellum:: 9: 16. The anterior trochanter of the male is provided with a tubercle and a fairly large field of small spines, as shown in Figure 8. There is also a row of spines confined to the distal half of the femur. The middle femur has a similar field of spines near the base and a continuous median row. The tibia is broad with a marked constriction at the base opposite the femoral tooth in both sexes (see Figures 2 and 4). The male genital capsule as shown in Figure 1.

Location of Types: Types are in the Francis Huntington Snow Entomological Museum and a pair of paratypes in the South Australian Museum at Adelaide. The type series consists of eight males and nine females bearing the label "Australia, Brisbane, Queensland, Dec., 1932, H. Hacker," and three males labeled "F. Armstrong, Began River, N. S. W. Australia via Mr. Deane."

Comparative Notes: This species is readily distinguished from **Enithares bergrothi** Mont. by its more elongate head, by its broad middle tibia, which is conspicuously constricted at the base, and by

*Contribution from Department of Entomology, University of Kansas.

the tubercle on the anterior trochanter of the males. The male genital capsule is also different, as shown in the drawings. The only other **Enithares** I recall having the male provided with a protuberance on the anterior trochanter is **Enithares chinai** Jaczewski, from Africa.



MINUTES OF THE SIXTEENTH ANNUAL MEETING KANSAS ENTOMOLOGICAL SOCIETY UNIVERSITY OF WICHITA, WICHITA, KANSAS MARCH 30, 1940

BUSINESS MEETING

President R. T. Cotton called the meeting to order at 10:45 A. M. in room 119, Science Hall.

The minutes of the 15th annual meeting were read and approvd.

REPORTS OF OFFICERS

The Secretary-Treasurer's report was read and approved. A summary of the report is as follows:

Receipts, April 1, 1939 to March 25, 1940	$690.69
Disbursements, April 1, 1939 to March 25, 1940	356.13
Balance, March 25, 1940	$334.56
Assets:	
U. S. Savings Bonds, Maturity value $850.00	$637.50
Balance in checking account	334.56
Accounts receivable	4.25
Cash on hand	3.50
Unexpended Balance, mailing acct. Manhattan P. O.	9.24
	$989.05
Liabilities: NONE	
Net assets, March 25, 1940	$989.05

REPORT OF THE EDITOR OF THE JOURNAL:
March 29, 1940

To the Entomological Society of Kansas:

Since the last meeting of the Society the four issues of the JOURNAL have been published. The new foremat and the publishing arrangements seem to the Editor to be a decided improvement, for which we are grateful to the printers and to Mr. Walkden for making the necessary arrangements.

During the past year the Editor has been handicapped by a distinct lack of manuscripts for publication, with the result that there has sometimes not been sufficient variety of articles in a given number. In addition, there has been some unused space because of a lack of very short articles or ntoes, which might have been used for fill-ins at the ends of larger articles. At the present time, there is not enough copy on hand for the next issue. In view of this situation may we urge, first, that all members of the Society submit as soon as possible manuscripts for articles which they wish published during the coming year. If these are submitted far enough in advance, better choice can be made of the articles for each issue. May we urge, in the second place, that all members of the Society be encouraged to submit brief notes which may be used for fill-ins. Such notes could frequently be submitted even by under-graduate students who have made some interesting observations as to occurance, behavior, life history, or some other interesting observation having to do with insect life.

The Editor is heartily in favor of effecting some arrangement whereby our JOURNAL becomes also the journal of the Texas Entomolog-

ical Society. The above report will show that we have a medium of publication which has room for more papers than we have been receiving. Undoubtedly, the addition of the Texas Society would strengthen the JOURNAL, so that after awhile it may be possible to increase the number of pages, thus making a very strong journal for the Middle West. In case such arrangement is made, it would be entirely proper to change the Editorial Board to give full representation to the Texas Society.

Respectfully submitted,

PAUL B. LAWSON, Editor

REPORT OF THE AUDITING COMMITTEE FOR 1940:

The Treasurer's accounts for the period April 1, 1939 to March 25, 1940 have been audited and found to be in order.

(Signed) D. A. Wilbur, W. T. Emery.

On motion, the report of the auditing committee was accepted.

APPOINTMENT OF COMMITTEES:

President Cotton appointed the following committees:

RESOLUTIONS: R. H. Painter, L. C. Woodruff, Chas. Curtiss.
NOMINATIONS: D. A. Wilbur, R. H. Beamer, D. B. Whelan.
AUDITING FOR 1941: H. R. Bryson, E. T. Jones.

OLD BUSINESS: NONE.

NEW BUSINESS: Dr. R. L. Parker discussed the correspondence he has had with a committee of the Texas Entomological Society relative to the affiliation of that Society with the Kansas Entomological Society for the purpose of publication of their proceedings and papers. A plan of affiliation has been drawn up by the Executive Committee of the Kansas Entomological Society and submitted to the publication committee of the Texas Entomologicol Society. If this plan is acceptable to the latter Society, it will provide for the publication of papers and proceedings originating in either Society, and will not involve any changes in the present set-up of the Kansas Journal except proper recognition of the Texas Society.

On motion, it was decided to appoint a Special Committee to deal with the Texas Entomological Society, the committee to consist of the Executive Committee and two additional members appointed by the President.

Then followed the presentation of papers, the program consisting of 28 titles, as follows:

1. A Discussion of Hessian Fly Resistance in Certain Wheat Varieties. E. T. Jones, U. S. Bur. Ent. and P. Q., Manhattan, Lantern. 10 min.
2. Host Relations and Geographic Distribution of New Species of Mexican Eurytomidae. Robt. E. Bugbee, F. H. K. S. C., Lantern. 10 min.
3. Observations on Sod Webworms of Kansas. H. D. O. Miller, K. S. C. 10 min.
4. The Alfalfa Plant Bug, **Adelphocoris lineolatus** (Goeze) Found in Kansas. Chas. Curtiss, K. S. C. 5 min.
5. Biology and Taxonomy of Bombyliid Predators on Grasshopper Eggs. R. H. Painter, K. S. C. 10 min.
6. The Role of Plastics in the Field of Entomology. Don B. Whelan, U. of Nebr. 10 min.

Afternoon session, 1:30 p. m.

7. Observations on the Seasonal Variation in Resistance of Some Stored Products Insects to High Temperature. H. H. Walkden, U. S. Bur. Ent. and P. Q., Manhattan. Lantern. 10 min.
8. Insect Infestation in Railroad Box-cars. T. F. Winburn, U. S. Bur. Ent. and P. Q., Manhattan. Lantern. 10 min.
9. Insect Infestation in Farm-stored Grain in Kansas. T. F. Winburn, U. S. Bur. Ent and P. Q., Manhattan. Lantern. 10 min.
10. Field Infestation of Wheat in Kansas and Nearby States. R. T. Cotton and T. F. Winburn, U. S. Bur. Ent. and P. Q., Manhattan. Lantern. 10 min.
11. The Ninth Annual Insect Population Summary of Kansas Covering the Year 1939. R. C. Smith and E. G. Kelly, K. S. C. 10 min.
12. A Study of Kansas Thyreocoridoe. R. I. Sailer, U. of K. 7 min.
13. Insect Growth Studies. L. C. Woodruff, U. of K. 7 min.
14. Some New Records of Kansas Arthropods. Louis Lipovsky. U. of K. 7 min.
15. Some New Distributional Notes on Hesperiidae. Wm. D. Field, U. of K. 7 min.
16. Okefenokee Swamp, Georgia in 1939. R. H. Beamer, U. of K. 7 min.
17. Trends in Morphological Research. Kathleen Doering. U. of K. 7 min.
18. New Aquatic Hemiptera from the Orient. H. B. Hungerford. U. of K. 7 min.
19. Economic Importance of Bibionidae. D. Elmo Hardy. U. of K. 7 min.
20. The Halobatinae in the University of Kansas Collection. Eugene Kenaga. U. of K. 7 min.
21. The Gerrinae in the University of Kansas Collection. Louis Kuitert. U. of K. 7 min.
22. Leafhopper Populations Inhabiting Pastures in Kansas, (Family Cicadellidae). D. A. Wilbur, K. S. C. Read by title.
23. Some Insects Infesting Poisy Ivy. Dick Schwitzgebel, K. S. C. Lantern. 8 min.
24. Some Recent Observations on the Sugar Cane Root-stock Weevil **Anacentrinus deplanatus** Csy. H. R. Bryson, K. S. C. 10 min.
25. Grasshoppers in the Scott County State Park. Roy Fritz, K. S. C. 10 min.
26. A Fine Specimen of a Fossil Dragon Fly Wing from the Elmo Beds—**Megatyphus schucherti** Tillyard. F. M. Carpenter, Museum of Comparative Zoology, Cambridge, Mass.
27. Some Parasite Flies Reared from the Adults of **Phyllophaga lanceolata** Say. Harry R. Bryson, K. S. C. 8 min.
28. Recent Work on the Arthropod Transmission of Equine Encephalomyelitis at Kansas State College. A. W. Grundmann, K. S. C. 5 min.

FINAL BUSINESS:

REPORT OF THE RESOLUTIONS COMMITTEE:

WHEREAS, the University of Wichita, The Kansas Academy of Science, and the Local Committee in charge have all cooperated in making the 16th annual meeting of this Society a success,

BE IT RESOLVED, that the thanks and appreciation of the Society be extended to the University of Wichita, the Kansas Academy of Science, and to the members of the Local Committee especially for the arrangements for the noon luncheon.

WHEREAS, the reports of the Secretary-Treasurer and the Editor show the businesss of the Society and its Journal to be in excellent order,

BE IT RESOLVED, that the Society express its appreciation to H. H. Walkden and P. B. Lawson for their efforts in their respective offices.

(Signed) L. C. Woodruff, R. H. Painter, Chas. Curtiss.

REPORT OF THE NOMINATIONS COMMITTEE:

Mr. Wilbur reported for the committee, placing in nomination the following members for officers for the coming year:

For President: R. L. Parker.
For Vice-President: D. Isely.
For Secretary-Treasurer: H. H. Walkden.

He added that Mr. Beamer and himself wished to place Mr. Whelan in nomination for Vice-President but that Mr. Whelan objected inasmuch as he was a member of the committee. Mr. Bryson placed Mr. Whelan in nomination for Vice-President. Nominations were closed. Mr. Painter moved that the Secretary cast a unanimous ballot for the President and Secretary-Treasurer, and that the members elect a Vice-President by a show of hands. Motion seconded and passed. On a showing of hands, Mr. Whelan was elected Vice-President.

It was left to the Executive Committee to select the time and place for the next meeting.

There were 45 members and friends in attendance from Lawrence, Manhattan, Wichita, Dodge City, Emporia, Hays, Garden City, Newton, and Coffeyville in Kansas, and Lincoln, Nebr., and Kansas City, Mo.

Adjournment was at 4:45 P. M.

Respectfully submitted,
H. H. WALKDEN, Secretary-Treasurer

INDEX—VOLUME 13

JOURNAL OF THE KANSAS ENTOMOLOGICAL SOCIETY

	Page
Achalarus lyciades (Geyer), A Distributional Note on	114
Alloeorrhynchus (Hemiptera: Nabidae), New and Little-known Species of	115
Amblyscirtes nysa Edwards (Lepidoptera:Hesperiidae), Distribution Notes on	7
Annual Meeting, Notice of	3
Argynnis cybele krautwurmi Holland, A Note on	129
Beamer, R. H., Article by	51
Bot Flies, Notes on Oklahoma	44
Bruce, W. G., Articles by	41, 128
Butterflies, New Records of . . . for Kansas	28
Butterfly Records, Some Unusual . . . for Kansas	30
Cochlorhinus Uhler and Some Related Genera of Leafhoppers	51
Contarinia juniperina Felt, The Juniper Midge	46
Copaeodes aurantiaca (Hewitson), Distributional Notes on	50
Dolichopodidae (Diptera), New Mid-Western	58

INDEX—VOLUME 13 (continued)

	Page
Dorylaidae Notes and Descriptions (Pipunculidae-Diptera)	101
Eddy, Gaines W., Article by	44
Emerson, Kary C., Article by	44
Enithares, A New . . . . for Australia (Notonectidae-Hemiptera)	130
Field, William D., Articles by 28,	30
Field, William D., Notes by 7, 50, 57, 57, 114, 123,	129
Fritz, Roy F., Article by	86
Goodrich, Arthur L., Jr., Article by	33
Grais stigmaticus (Mabille), A Distribution Note on	57
Grasshopper Population of Typical Pastures in the Bluestem Region of Kansas	86
Hardy, D. Elmo, Articles by 15,	101
Harmston, F. C., Article by	58
Harris, Halbert M., Article by	115
Heterochroa bredowii (Geyer), A Distributional Note on	123
Horn Flies on Cattle, Intravenous Injections of Arsenic Ineffective in Controlling	128
Horn Flies, The Medication of Cattle for the Control of	41
Hungerford, H. B., Articles by 8,	130
Insect Population Summary of Kansas, 1939 . . . The Ninth Annual	65
Kelly, E. G., Article by	65
Knowlton, G. F., Article by	58
Miller, H. D. Oliver, Article by	1
Minutes of the Sixteenth Annual Meeting	132
Mormon Cricket Injury to Forage, A Field Method for Estimating	124
New Corixidae from China, Manchuria and Formosa	8
Parker, Ralph L., Article by	46
Phyllophaga from Jamaica, A New	14
Phyllophaga, Notes on Texas . . . with Description of One New Species	4
Plecia (Bibionidae-Diptera), Studies in New World	15
Reinhard, H. J., Article by	4
Sailer, R. I., Article by	62
Sanderson, Milton W., Article by	14
Skipper Record for the United States, A New	57
Smith, Roger C., Article by	65
Starling Attacks upon Warble Infested Cattle in the Great Plains Area	33
Stenoma mistrella Busck (Stenomidae, Lepidoptera), Observations on	1
Swain, Ralph B., Article by	124
Telenomus ovivorus (Ashmead), an Egg-parasite of the False Chinch Bug	6
Thyreocorinae, A New Species of	62
Wadley, F. M., Article by	6
Wenger, Otto E., Article by	46
Wilbur, Donald A., Article by	86

REPRINT PRICES

JOURNAL OF THE KANSAS ENTOMOLOGICAL SOCIETY

Pages	1-2	3-4	5-8	9-12	13-16	17-20	21-24	25-28
50 copies	$1.10	$1.40	$3.85	$5.25	$7.45	$ 9.65	$11.85	$14.05
100 copies	1.40	1.65	4.15	5.80	8.00	10.20	12.40	14.60
200 copies	1.65	2.20	4.95	7.15	9.35	11.55	13.75	15.95
100 Add'n'l	0.55	1.10	2.20	3.30	4.40	5.50	6.60	7.70

Tables—for setting up—$1.25 per page extra.

Covers, per 100—$2.50

Fifty copies of reprints are free to the authors provided at least 50 copies are purchased. Reprints should be ordered in lots of 50 or multiples thereof.

Postage or express charges on carriage of reprints are extra

PRICE OF BACK VOLUMES

Volume 1 ----------$2.00

Volumes 2 to 7 inclusive ---------- 1.00

Volumes 8 to date ---------- 1.50

Subscriptions for back volumes or numbers should be sent to the Secretary-Treasurer, Entomology Department, Kansas State College, Manhattan, Kansas.

CONTENTS OF THIS NUMBER

Dorylaidae Notes and Descriptions (Pipunculidae-Diptera) D. Elmo Hardy ---------- 101

A Distributional Note on Achalarus lyciades (Geyer) (Lepidoptera: Hesperiidae) Wm. D. Field ---------- 114

New and Little-known Species of Alloeorrhynchus (Hemiptera: Nabidae). Halbert M. Harris ---------- 115

A Distributonal Note on Heterochroa bredowii (Geyer). (Lepidoptera: Nymphalidae). Wm. D. Field ---------- 123

A Field Method for Estimating Mormon Cricket Injury to Forage. Ralph B. Swain ---------- 124

Intravenous Injections of Arsenic Ineffective in Controlling Horn Flies on Cattle. W. G. Bruce ---------- 128

A Note on Argynnis cybele krautwurmi Holland (Lepidoptera: Nymphalidae). Wm. D. Field ---------- 129

A New Enithares for Australia (Notonectidae-Hemiptera) H. B. Hungerford ---------- 130

Minutes of the Sixteenth Annual Meeting, Wichita ---------- 132

Index—Volume 13 ---------- 135

JOURNAL OF THE KANSAS ENTOMOLOGICAL SOCIETY

—□—

A quarterly journal published in January, April, July and October devoted to Entomology in the Western Mississippi Basin and the proceedings of the Kansas Entomological Society.

Manuscripts for publication may be sent to any of the publication committee.

The Kansas Entomological Society does not make exchanges since the Society does not maintain a library.

Subscription to the Journal must be paid in advance. The subscription rate is so low that second notices are not ordinarily sent out.

Payment of Canadian or other foreign subscriptions and bills must be made by international Postal Money Order or by a draft on a New York bank and payable in U. S. A. dollars.

Subscribers are urged to give us their full cooperation in these matters.

Subscriptions should be sent to the Secretary-Treasurer, 1204 Fremont, Manhattan, Kansas.

Subscriptions in the U. S. A.,	**$1.50 per year**	**Single Copy**
Canadian or foreign subscriptions,	**1.75 per year**	**60 cents**

KANSAS ENTOMOLOGICAL SOCIETY

President, R. L. Parker, Manhattan

Vice-President, Don B. Whelan, Lincoln, Nebraska

Secretary-Treasurer, Donald A. Wilbur, Manhattan

Volume 13, No. 4, October, 1940